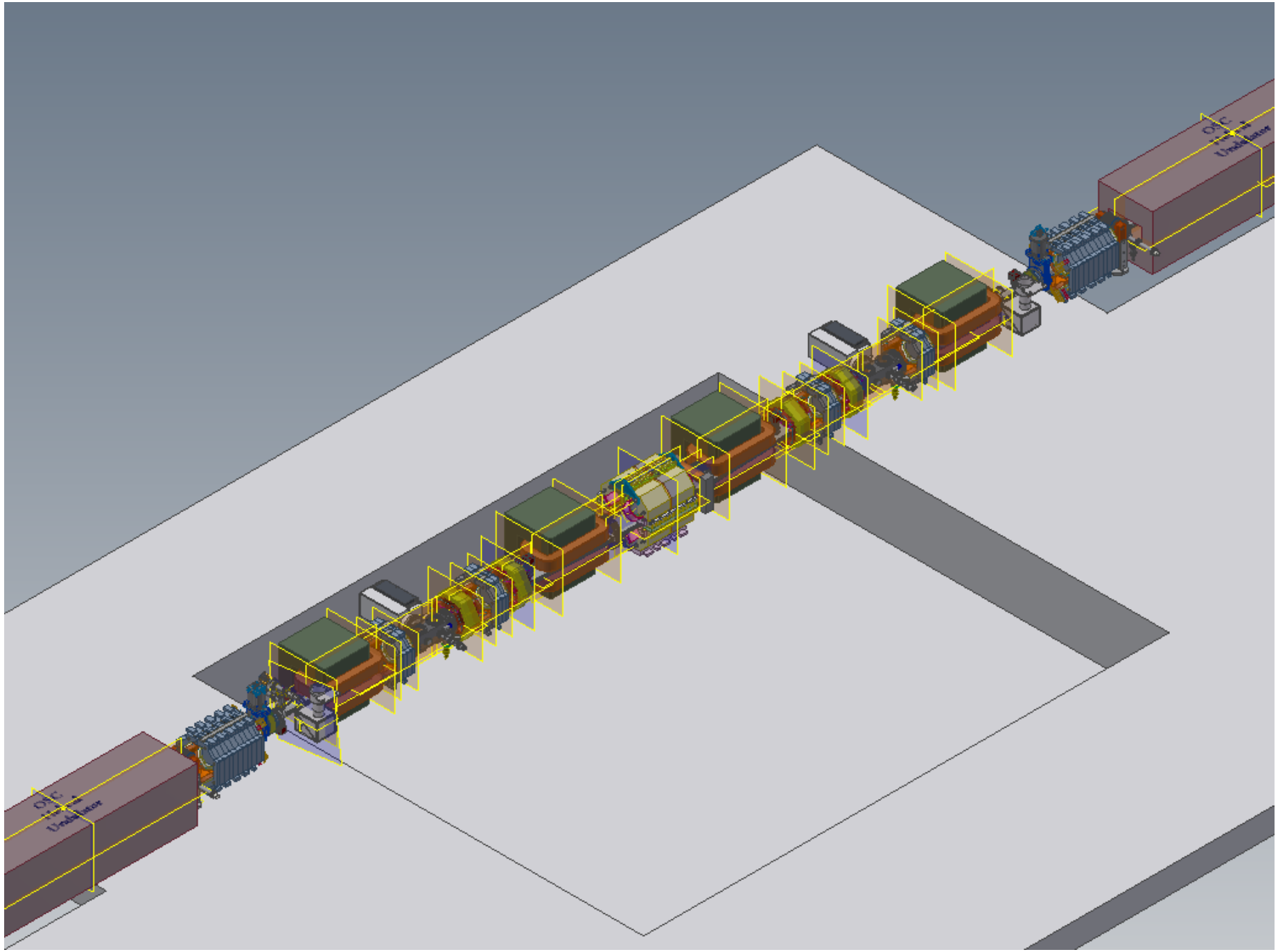
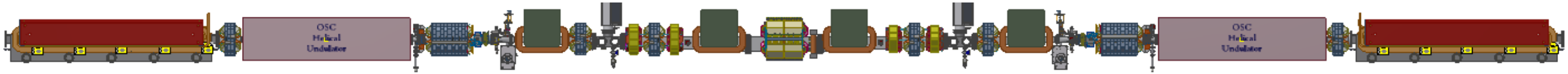
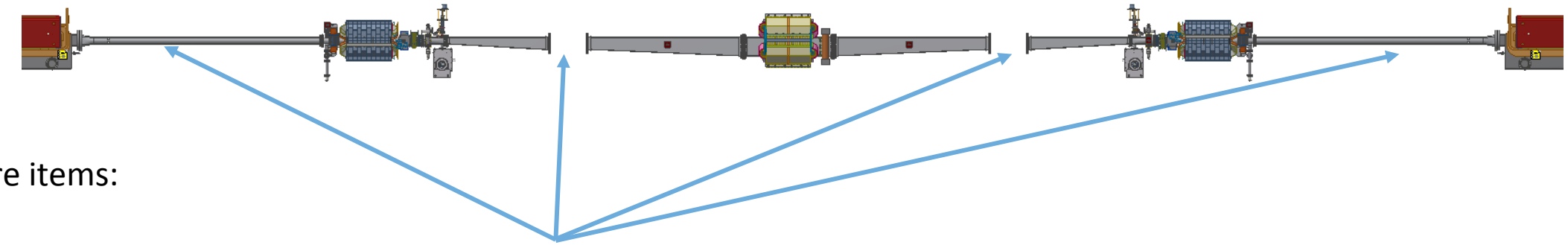
OSC Layout Update and Considerations
11/20/2018



Phase 2
Summer 2019?

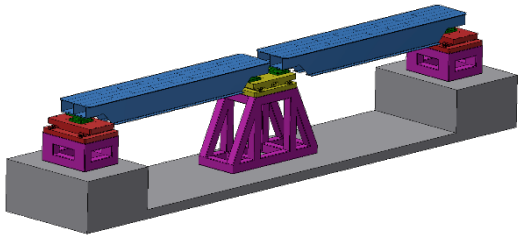


Phase 1
Summer 2018

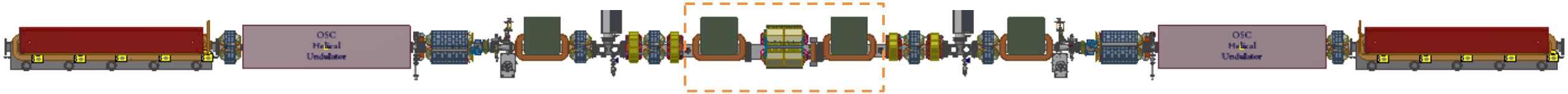


Core items:

1. Complete vacuum system with placeholder beam pipes
2. Motion system that will support all magnets and OSC equipment in the bypass
3. Stands/supports for beam pipes
4. BPMs
5. New synch light optics chambers
6. Extra wide window frame horizontal steering
7. Modify existing CESR soft bends to add a viewport?
8. Coordinate with Rich Gallagher to schedule removal of existing L3 equipment

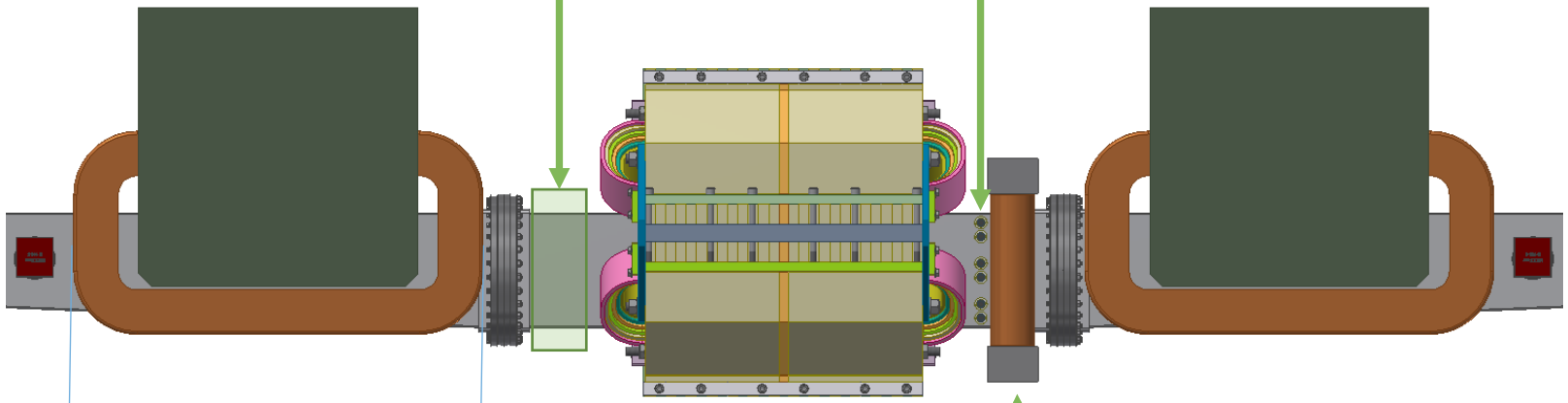


Redesigned/cheaper rails or motion system



14 cm length
Reserved for filter

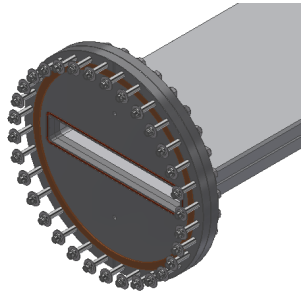
12 button BPM

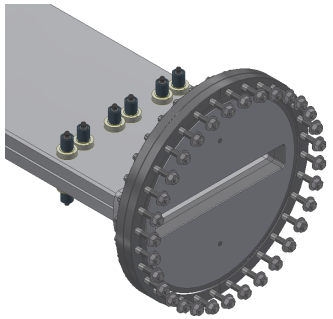


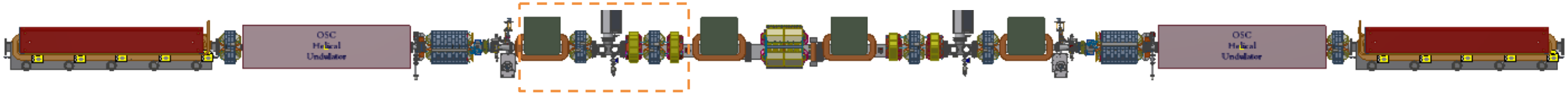
0.82m

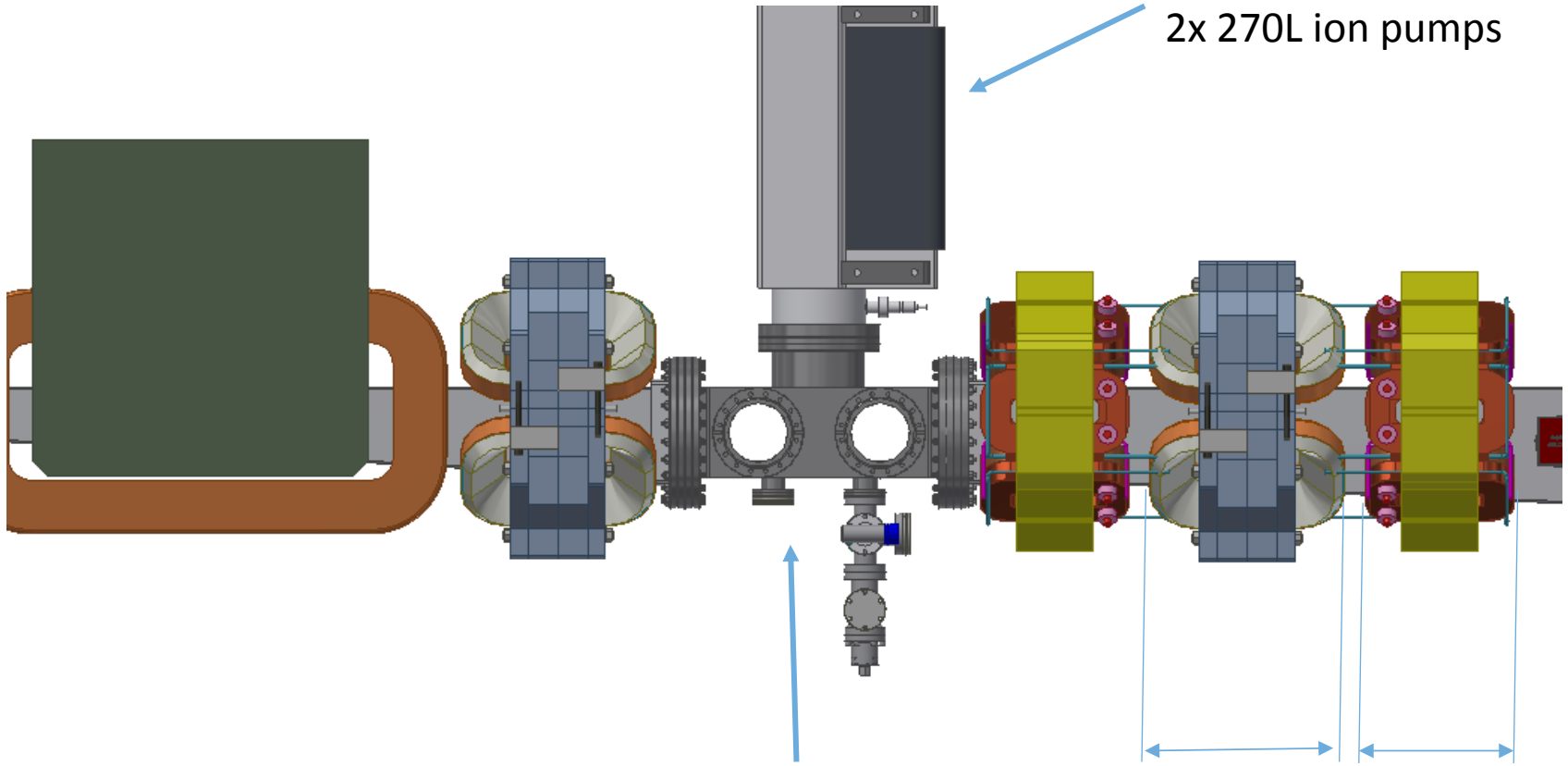
Extra wide
window frame
horizontal steering

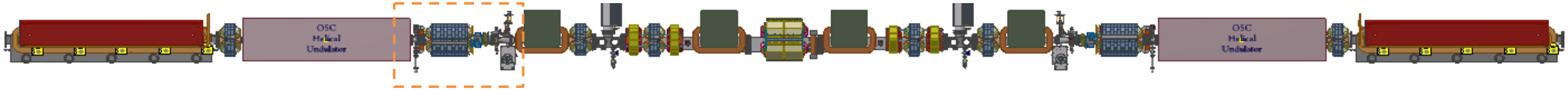
CHESS RF Flanges
Bal Seal

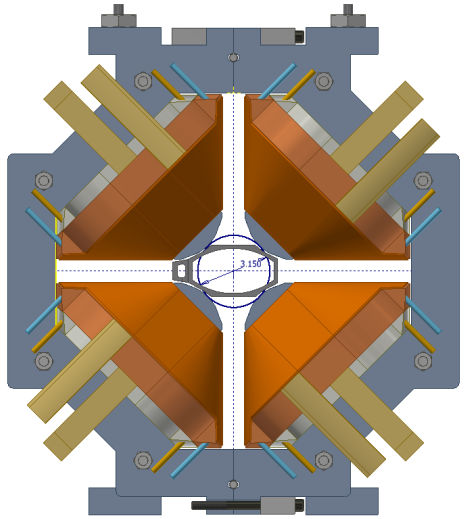





OSC
Helical
Undulator
OSC
Helical
Undulator


Re-use existing
2x 270L ion pumps
OSC optics chamber
Usable inside length: 38 cm
32.5cm
24.5cm

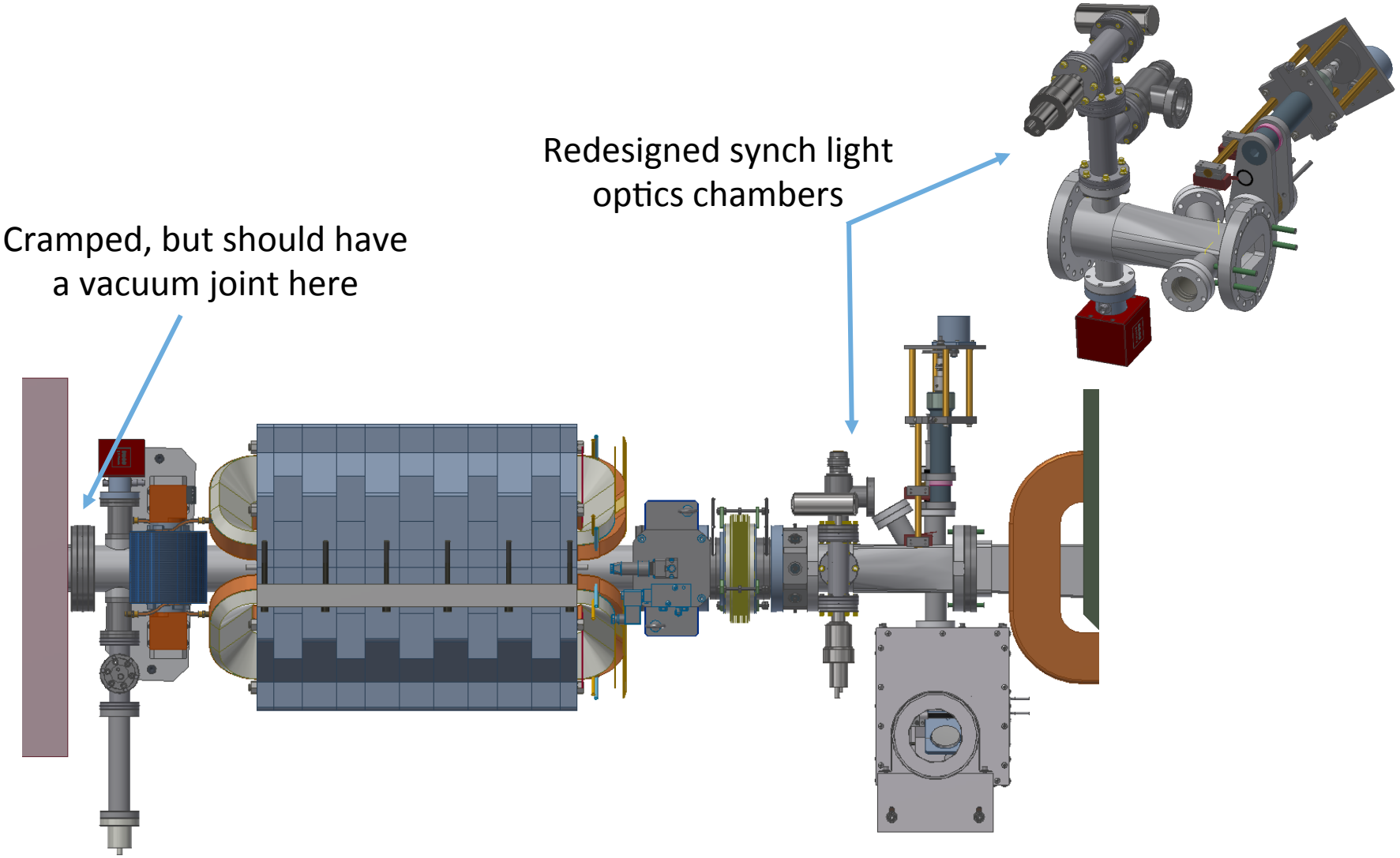




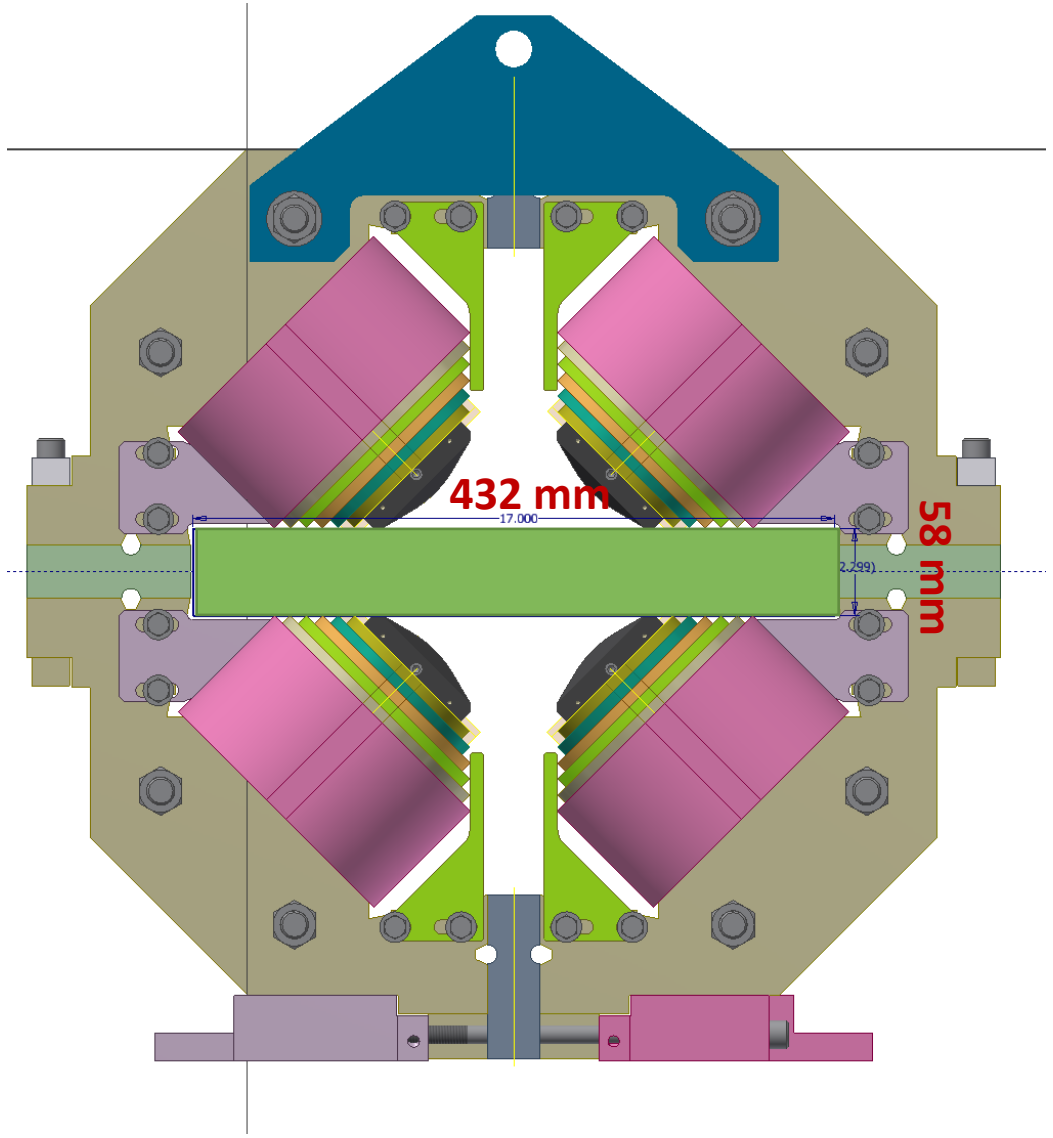
CESR MKII:
Max 80mm OD
Beam pipe

Cramped, but should have
a vacuum joint here

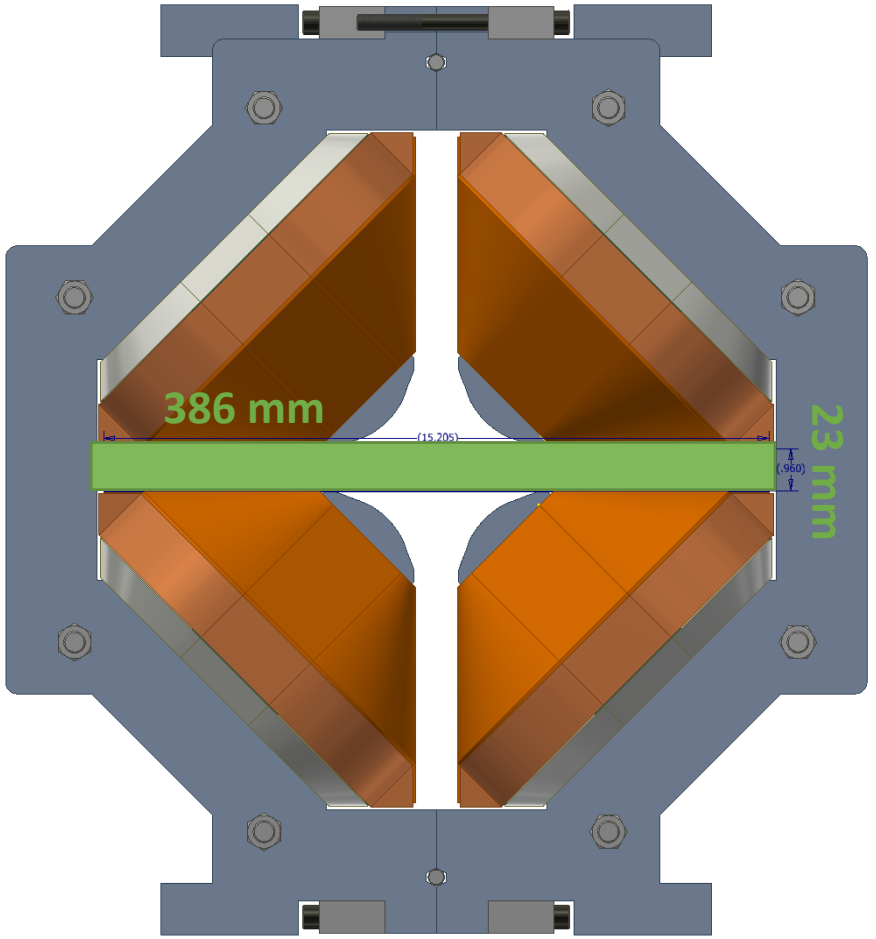
Redesigned synch light
optics chambers



Center Quad Q49



20 cm OSC Quads



Vacuum chamber aperture considerations for OSC Bypass Optics

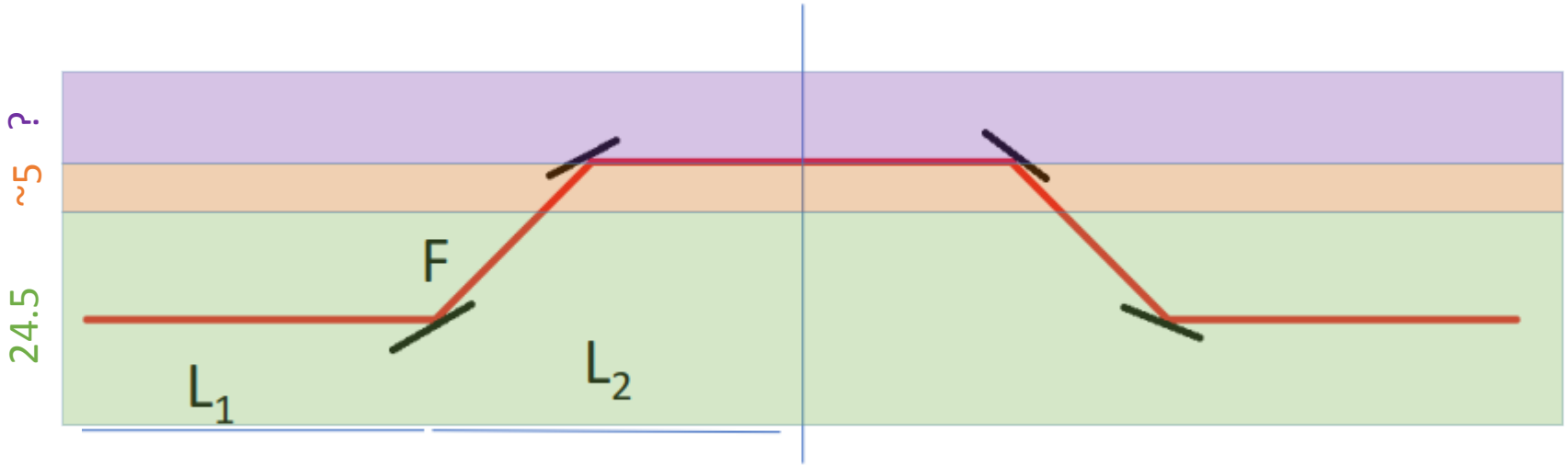
24.5 mm height

71 mm width

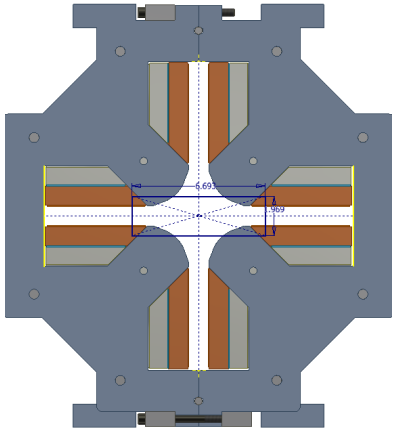
CHESS-U rev5.6.4
Latest OSC lattice
1% emittance coupling

Angular acceptance (γθ)	4.00
Mirror half-width in tilt direction (cm)	14.7
Mirror half-width in horizontal plane (cm)	0.854
Chamber length (cm)	43.8
Dog leg-length (cm)	14.5
Mirror angle	3.35
Light vertical off-set (mm)	17.1
OSC kick (meV)	258

Side view inside vacuum chamber

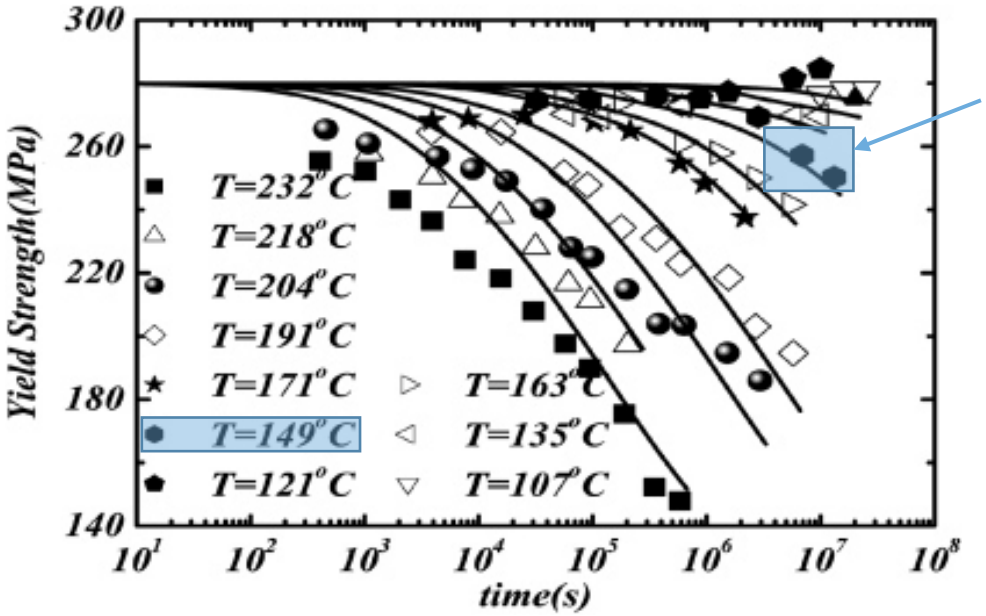


What is an appropriate OSC chamber inner height and what should we do about the CESR MKII laminations?



Inner quads:
17 cm x 50mm
beam pipe

Vacuum chamber considerations for OSC Bypass Optics



~15% drop in yield strength after aging during bake out

Figure 18. Ageing data for alloy 6061 for reheating from the T6 condition for 10 temperatures. Samaras 2006

TO DO:

- Simulate and detail design vacuum chambers
- Update and check vacuum quality with proposed system and final inner dimensions
- Verify clearances for quadrupole and bend magnet coils w.r.t. flange bolt pass-throughs